

Idaho" created by Steve Caicco, and Ciscell (IDWR, in press). This portion was mapped at a scale of 1:500,000. The specific vegetation types were aggregated into five general categories representing rangelands, agriculture, forests, lava flows, and riparian areas.

Water Use

All communities within the Snake-Payette Rivers Hydrologic Unit pump domestic water from wells, which is one of the greatest justifications for protecting ground water. The non-domestic water use in the northeast, open range portion of the hydrologic unit is significantly less than the non-domestic water use in the southeast, agricultural portion.

About 85 percent of the cropland in the, southeast agricultural portion of the hydrologic unit is furrow irrigated. The remaining cropland is either sprinkler irrigated (15 percent) or is dry farmed.

Water for irrigation is delivered through several canals, that which the result of irrigation projects and were constructed in the early 1900's. These canals now deliver water to more than 200,000 acres of farmland. Reservoirs on the Boise, Payette, and Weiser Rivers and their tributaries are the primary storage sources for this water. Irrigation water is also pumped or diverted from the Snake River.

Materials and Methods

This assessment was prepared using existing data from various sources, explained in this section. This section also explains the computer data management

techniques that were used to compile this data into a useable data base.


Sources of data

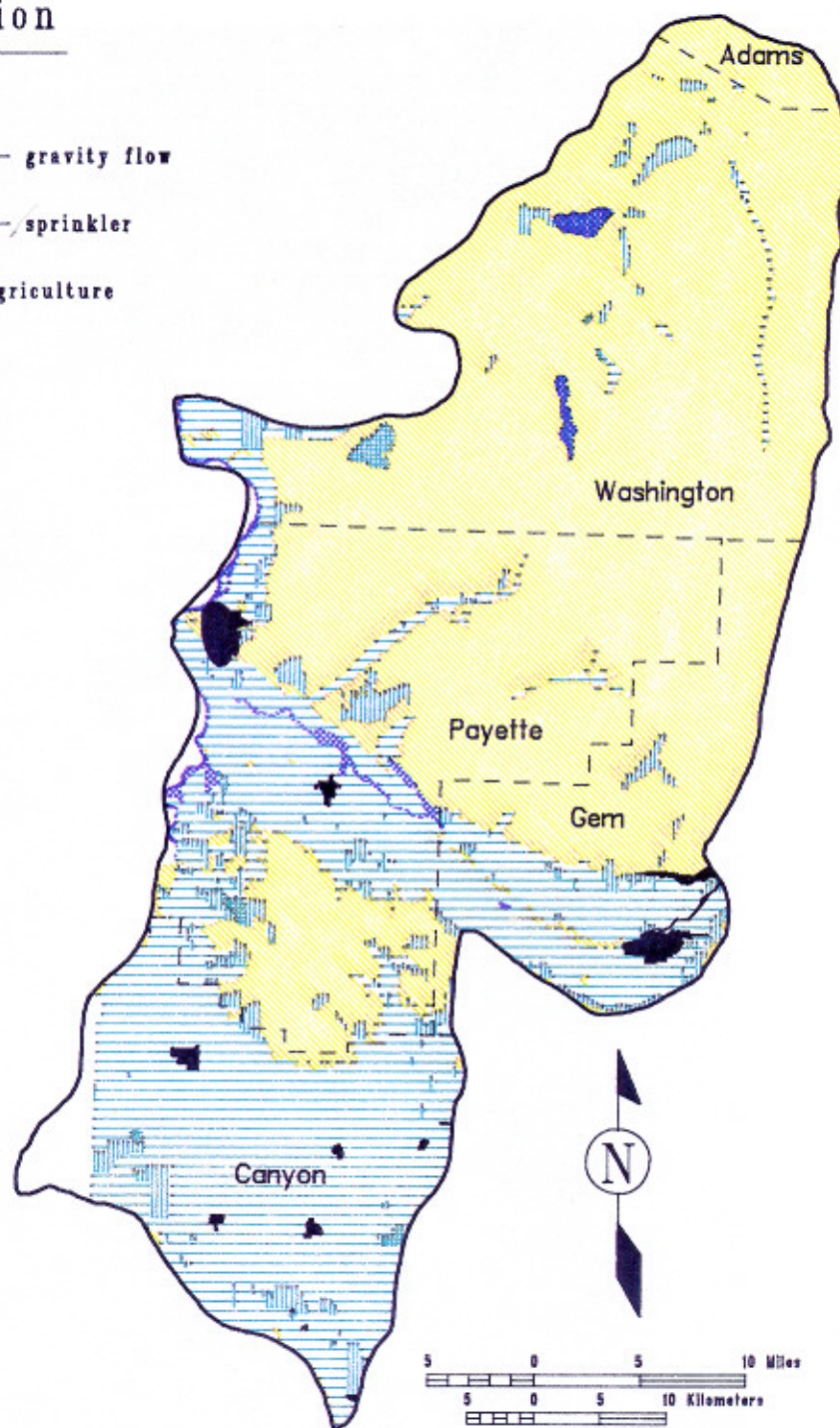
The data used in this hydrologic unit ground water assessment were generated from three sources. These sources are the Idaho Farm Bureau Federation reconnaissance ground water quality surveys (IFBF/RGWQS), IDEQ special projects, and the USGS/WRD data base. There are a total of 436 samples considered. The data are represented in tabular form in the Appendix of this assessment, (Table IV, V, and VI).

Idaho Farm Bureau Reconnaissance Ground Water Quality Surveys

The IFBF/RGWQS consisted of individual county-wide sampling events, conducted to generate reconnaissance level nitrate ground water data. The methods used for each of these surveys were similar. Private domestic wells were used within the general area. Portions of two of these surveys (Canyon County IFBF/RGWQS, January 1991, and Gem and Payette Counties IFBF/RGWQS, March 1991) were used to describe conditions in the hydrologic unit. These IFBF/RGWQS were performed through a cooperative interagency and private sector program. Participants include; the Idaho Farm Bureau Federation (IFBF), local County Farm Bureau Federations, the Idaho Division of Environmental Quality, the University of Idaho Analytical Laboratory, and members of the general public.

Explanation

-  rangeland
-  irrigated - gravity flow
-  irrigated - sprinkler
-  dryland agriculture
-  water
-  riparian
-  urban
-  hydrologic unit boundary
-  county lines



Scale 1:500,000

Figure 6. General land use within the hydrologic unit.

Participants were required to purchase sample bottles from IFBF centers prior to sampling. These participants were briefed in standard sample collection procedures for nitrates prior to collecting samples via an instruction sheet. Samples were taken, then delivered to collection centers. The samples were preserved, by acidification (addition of 0.25 ml sulfuric acid) and chilled by IDEQ staff, for the delivery to the laboratory. Sample containers brought to the collection centers were also refrigerated at 4° celsius and were listed on the IFBF Chain of Custody Inventory List for sample tracking. Participants also submitted a completed questionnaire which listed pertinent well information. The site from which the sample was taken was marked on a map at the collection centers by the individual submitting the sample with the assistance of a County Farm Bureau Federation volunteer. Samples were transported to and analyzed by University of Idaho Analytical Laboratory.

Standard quality assurance/quality control (QA/QC) procedures were employed on about ten percent of all samples collected by IDEQ staff or IDEQ trained staff. Transport and transfer blanks were analyzed to detect possible interferences introduced during sampling and transportation to verify method detection limits. Laboratory spiked samples were analyzed to measure analytical accuracy. Duplicate samples were taken to estimate analytical precision and variation between public and IDEQ sampling techniques.

Nitrate concentrations were analyzed by University of Idaho Analytical Laboratory, as nitrite and nitrate as nitrogen ($\text{NO}_2 + \text{NO}_3$ as N), using standard Method 353.2 (Automated Cadmium Reduction Technique). IDEQ review of the QA/QC

data concludes that there is confidence in the validity of the nitrate concentration data.

Sampling locations are questionable because of the absence of QA/QC verification. Locations were plotted on maps by individuals with limited experience with these types of maps. IDEQ's spot check revealed many inaccuracies in locational data on a similar project. Source of sample data was also not controlled. There is no assurance or control of the water quality sample locations. The samples may be from city water systems or after water-treatment.

Idaho Division of Environmental Quality Special Projects

IDEQ special projects are conducted in order to evaluate the status of ground water quality with respect to contamination from various sources. The IDEQ special projects that were conducted within the hydrologic unit are *Ground Water Quality Investigation in the Vicinity of Fruitland, Idaho* (IDEQ, in prep.) *Weiser Area Ground Water and Soils Monitoring Study* (Baldwin and Wicherski, unpublished) and *Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho* (Baldwin and Wicherski, in prep.). The methods used for the three IDEQ special projects were similar.

These special projects were performed through a cooperative interagency venture. Participants include IDEQ, Payette Soil and Water Conservation District, Idaho Soil Conservation Commission, Idaho Department of Health and Welfare/Bureau of Laboratories (IDHW/BOL), and others.

The initial phase of each of these studies consisted of a selection of wells to be

sampled and analyzed. For example, in the above mentioned Payette study the initial phase April and May of 1991, consisted of taking samples and measurements from 80 wells within the study area. These 80 wells were randomly selected and specific types of criteria were used. Well owners were interviewed; IDEQ staff obtained information on well construction, water use, crop history, and other related information during these interviews. Following this initial phase, in the case of the Payette study, quarterly samples were taken from a subset of the initial wells.

Data collection for these studies, followed standard operating procedures for sampling. All water samples for nitrate were collected in clean polyethylene 500 ml containers, chilled to 4° Celsius, and were preserved with 2 ml sulfuric acid. Pesticide samples were collected in one liter amber glass jugs and were cooled to 4° Celsius. Well water levels and well depths were measured, when accessible. Samples were delivered to IDHW/BOL, where they were analyzed for nitrate, other inorganic, and pesticide compounds.

IDEQ standard QA/QC procedures were used. These procedures include travel and transfer blanks, that were analyzed to check field sample collection techniques. Laboratory spikes were added to selected samples for laboratory recovery accuracy. Duplicate nitrate and pesticide samples were collected from ten percent of the sampled wells, as part of IDEQ standard QA/QC procedures.

Data used in this hydrologic unit assessment from these surveys are expressed as nitrate concentrations, water table elevations, and locations. Nitrate concentrations were determined by IDHW/BOL and were analyzed as nitrate

as nitrogen (Nitrate as N) using method IDHW/BOL 109. IDEQ review of the QA/QC data concludes that there is confidence in the validity of the nitrate and pesticide concentration data, locations, and depth to water measurements.

United States Geological Survey Water Resource Division

The USGS/WRD data base WATSTORE is a nationwide collection of all available monitoring data collected by USGS, and other affiliated agencies. The methods of data collection include USGS standard operating procedures and USGS standard QA/QC. IDEQ is confident in the validity of the data used from this data base due to methods used by USGS.

Preparation

The preparation of this assessment required construction of a data base from existing data. Use of brand names in this assessment are for identification purposes only and do not constitute endorsement by the authors or their respective agencies.

The software used to create the data base was d-Base III plus by Ashton Tate. In order to keep this data base as simple as possible, sites (sampling locations) with multiple values for nitrates were manually sorted to find a single representative value at each location. This process was completed by manually selecting the highest nitrate value for each location that did not deviate from the remaining values by more than ten percent. This sorting process was conducted primarily on the *Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho*, April 1991 to March 1992 data and

data contributed by USGS/WRD. There are 14 fields associated with this data base and description of these fields is covered in the Description of Data Fields section. Once this data base was completed, the data were used for Geographic Information System (GIS) analysis and other statistical analysis. Plates and most figures in this report were created using Environmental Systems Research Institute Inc.'s GIS PC Arc/Info software.

Results and Discussion

The following section examines the data for the Snake-Payette Rivers Hydrologic Unit. The data from the previously mentioned sources were combined to create a single data base.

Pesticides

There are few existing pesticide data within the hydrologic unit. Due to cost, not many samples have been analyzed for pesticides within the hydrologic unit. The data used are from the following IDEQ studies: *Ground Water Quality Investigation in the Vicinity of Fruitland, Idaho* (IDEQ, unpublished); *Weiser Area Ground Water and Soils Monitoring Study* (Baldwin and Wicherski, unpublished); and *Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho* (Baldwin and Wicherski, in prep.).

Within the hydrologic unit there have been 63 ground water samples analyzed for pesticides. Of these 63 ground water samples, there have been 41 detections of five different pesticide compounds from 30 different locations. Of these 41 detections,

29 are Dacthal (or acid metabolite), nine are Pentachlorophenol, one is 2,4-D, one is Diazinon, and one is Metribuzin (see table II). Sample locations of pesticide

Table II. Pesticide data distribution.

<u>name of contaminant</u>	<u>number of detections</u>
Dacthal	29
PCP*	9
2,4-D**	1
Diazinon	1
Metribuzin	1
total	41
* Pentachlorophenol	
** 2,4-Dichlorophenoxyacetic acid	

detections within the hydrologic unit are shown in Figure 8. Figure 8 represents each combination of the pesticides detected at a single location with a different symbol. Concentrations are not represented. The ranges of concentrations detected for the pesticides and their corresponding Maximum Contaminant Level (MCL) or Lifetime Health Advisory Level (HAL) for drinking water are included in Table III.

From these data there are two major areas of pesticide concern. The western portion of the lower Payette river valley and the Sunnyside region south west of Weiser. Both areas are extensively farmed and furrow is the predominate form of irrigation. Common crops are corn, sugar beets, small grains, alfalfa, onions, and mint. Both areas are believed to have been impacted by non-point source pollution of the ground water from pesticides. There are not enough pesticide